science, which is as important for peace as for war purposes.

METEOROLOGY AND THE SCARBOROUGH RAID.

It is by no means surprising that for their raid on the three British coast towns the Germans should have profited so accurately by climatic conditions. When they first entered Belgium their army corps were immediately followed by the full staff of their observatories. On August 16 the astronomers and meteorologists attached to the Aix-la-Chapelle army corps took up their quarters at Liège, and on August 25 they were all at the Brussels Observatory at Uccle, where, on September 1, they were replaced by astronomers and meteorologists from Berlin.

Immediately on arriving at the Brussels Observatory the Germans turned out the Belgian staff. They made use of the Belgian instruments but supplemented them by the very up-to-date instruments they had brought from Berlin. On September 3 they began hunting for a Belgian hydrogen factory where they could obtain hydrogen for filling their testing balloons, by means of which they make their observations for predicting fogs. They used these balloons for forecasting the weather, particularly for the great German attack on Antwerp.

There is abundant evidence that the German men of science followed the same course with regard to the German raid on Scarborough, Hartlepool, and Whitby. They are admirably equipped for forecasting fog forty-eight hours ahead wherever they are. The German Army meteorological stations have certainly been transferred to Ostend and Zeebrugge. They may not be as important as submarines, but these observation stations can render almost as effective aid in Germany's work of destruction as these engines.

NOTES.

M. C. E. GUILLAUME, the director of the Bureau des Poids et Mesures at the Pavillon de Breteuil, Sèvres, has made it known that the Institute of France has started a hospital, using for the purpose the funds at its disposal, and the voluntary contributions of its members. In Great Britain there are about thirty Associés Etrangers and correspondants of the institute, who have been notified of the action of the institute, and they have responded generously to the appeal of their French colleagues.

WE learn from *Science* of the death at sixty-four years of age of Dr. D. E. Salmon, chief of the U.S. Bureau of Animal Industry from 1884 to 1906.

WE regret to announce the death, at seventy-one years of age, of Mr. A. R. Hunt, of Torquay, fellow of the Geological and Linnean Societies.

WE regret to see the announcement of the death on November 10, at seventy-five years of age, of Prof. N. C. Dunér, secretary of the Swedish Royal Society of Science, Upsala, associate of the Royal Astronomical Society, and author of astronomical works of prime importance.

IT is announced that, owing to continued ill-health, Dr. E. F. Bashford has resigned the post of general superintendent of the Imperial Cancer Research Fund, which he has held for the past eight years, and that his resignation has been accepted by the executive committee.

THE Royal Geographical Society has arranged two lectures to young people for the new year. On January 4, Mr. C. Carus-Wilson will lecture on the earth's unstable crust; and on January 8 the Rev. T. T. Norgate will take as his subject the theatres of war, illustrated. The meetings will be held in the Kensington Town Hall, High Street, Kensington, at 3.30 p.m. Application for tickets should be made to the chief clerk, Royal Geographical Society, Kensington Gore, S.W.

AT the fifth annual general meeting of the Society of Engineers (Incorporated), held on Monday, December 14, the awards of premiums made in respect of papers published in the journal of the society during 1914 were announced as follows:—The president's gold medal to Mr. A. S. E. Ackermann for his paper on the utilisation of solar energy; the Bessemer premium, value *5l.* *5s.*, to Mr. A. S. Buckle for his paper on cylinder bridge foundations in the East; the Clarke premium, value *5l.* *5s.*, to Mr. S. M. Dodington for his paper on mechanical appliances for the painless killing of animals; the premium, value *3l.* *3s.*, for members of affiliated societies, to Mr. R. H. Cunningham (Crystal Palace Engineering School) for his paper on irrigation in India; a society's premium, value *2l.* *2s.*, *to* Mr. James Tonge for his paper on uses of the hydraulic mining cartridge. Mr. Norman Scorgie was elected president of the society for 1915.

THE Royal Institution has circulated an illustrated brochure which explains for popular purposes the nature and objects of the institution. The institution was established under a charter of George III. in 1800, and enlarged and confirmed by an Act of Parliament in 1810. The objects of the foundation are "to prosecute scientific and literary research; to illustrate and diffuse the principles of inductive and experimental science; to promote social intercourse among lovers of science, men and women; and to afford them opportunities for collective and individual study." It is not necessary to insist upon the value to the world of the scientific work accomplished in the laboratories of the Royal Institution, when the names of a few of the great men who have worked there are recalled: Davy, Faraday, Tyndall, to say nothing of living men of science. The hope may be expressed that there will be no diminution of the usefulness and popularity of the institution in view of the war, but that its influence may become increasingly powerful as the years pass.

A DISTINGUISHED traveller and servant of the Empire has passed away in Archibald Ross Colquhoun, who died on December 18. He was born in 1848, and his earliest civil service was in the Indian police. From this he passed to the public works department, and then became secretary to a Government mission to Siam, and the Siamese Shan States. Later he was Deputy Commissioner of Upper Burma, but before this, in 1881–82, he made an important journey from Canton to Bhamo, investigating the possibilities for a Burma-Chinese railway route, and also acted as a special correspondent in the French war in Tongking (1883–84). Afterwards, having left Government service in the East, he came into contact with Cecil Rhodes, served with the South African pioneer force, and became administrator of Mashonaland in 1890. In later years he travelled extensively and wrote much on South Africa, on the Far East, on the Pacific and the Panama Canal schemes, and on other topics. Some of his books are important contributions to the study of great political questions, such as "The Key of the Pacific" (on the Panama Canal routes), "China in Transformation," "The Mastery of the Pacific," and "The Afrikander Land." He was closely associated with the work of the Royal Colonial Institute, and was editor of its journal, and among various honours he received the gold medal of the Royal Geographical Society.

THE organised methods employed by Germany in commerce, and the means necessary to meet them successfully, were referred to by Sir William Ramsay in an article contributed by him to NATURE of November 12 (p. 275). Sir William deals with the same subject in further detail in a paper just issued by the Institute of Industry and Commerce (Aldwych Site, Strand, W.C.) The German military organisation has its counterpart in their commercial organisation; there exists an Imperial Council the proceedings of which are kept quiet, but which takes into consideration all obtainable statistics, and so far as possible legislates, or endeavours to legislate, on the basis of these statistics. Where fiscal duties are found to be required, such a council puts them on; where there is an advantage in taking them off, they are removed. Where cheap transit is possible they give it; for the railways are the property of the State. In referring to these matters at the annual meeting of the Society of Chemical Industry in 1903, Sir William Ramsay said:—"Is it to be expected that any country can fight such a combination as that without adopting, at all events, something of their methods, or without studying their methods, and without combining together, if not to imitate them, at least to thwart them? There is a military campaign against us, and we must defend ourselves." Sir William points out that it will be necessary, if the future German State is allowed to retain the power of waging an industrial war, to combat it by the action of the organised British nation, that is, by the State. Once that conquest is achieved, we should do well to remember that commerce should be co-operative and not competitive; that it is to our interest not only that we ourselves should prosper, but that others should also prosper; that, indeed, our own prosperity is bound up in the prosperity of our fellow-creatures.

THE Philadelphia meeting of the American Association for the Advancement of Science will open on Monday, December 28, when the retiring president, Prof. E. B. Wilson, of Columbia University, will introduce the president of the meeting, Dr. C. W. Eliot, of Harvard. Addresses of welcome by the provost and the governor-elect will be replied to by President Eliot, after which retiring President Wilson will deliver his address on "Some Aspects of Progress in Modern Zoology." There will be two public lectures, complimentary to the citizens of Philadelphia and vicinity, one on Tuesday night, at 8 o'clock, being by Dr. D. C. Miller, "The Science of Musical Sounds." On Wednesday night, at 8 o'clock, Dr. W. H. Nichols will lecture on "The War and the Chemical Industry." The titles of the addresses by the retiring presidents of the sections are as follows:—*Physics*: Recent evidence for the existence of the nucleus atom, A. D. Cole; *Botany*: The economic trend of botany, H. C. Cowles; *Anthropology and Psychology*: The function and test of definition and method in psychology, W. B. Pillsbury; *Mathematics and Astronomy*: The object of astronomical and mathematical research, F. Schlesinger; *Agriculture*: The place of research and of publicity in the forthcoming country life development, L. H. Bailey; *Education*: The American rural school, P. P. Claxton; *Engineering*: Safety Engineering, O. P. Hood; *Geology and Geography*: The relief of our Pacific coast, J. S. Diller; *Physiology and Experimental Medicine*: The classification of nervous reactions, T. Hough; *Social and Economic Science*: Social and economic value of industrial museums, J. G. Wall; *Zoology*: The research work of the Tortugas Laboratory of the Carnegie Institution of Washington, A. G. Mayer; *Chemistry*: Fermentation, C. S. Alsberg.

AT a good old age—eighty-six—the famous Swiss guide, Melchior Anderegg, has passed to his rest. Born near Meiringen, at which place he died, he was bred and lived, except when undertaking some longer excursion, in the Oberland. He was introduced, if we remember rightly, to the Alpine fraternity by the late T. W. Hinchliff, who described, in his delightful "Summer Months among the Alps," excursions with him across the Strahlegg Pass in 1855 and up the Altels in the following year. Melchior's "great ascents" were rather more than twenty, for his employers, among whom we may number the Walkers, father, son, and daughter, A. W. Moore, H. B. George, F. Morsehead, C. E. Mathews, and Leslie Stephen, belonged to the old guard of Alpine climbers and did not consider the charms of an expedition enhanced by needless perils. The more notable of those ascents were Mont Blanc by the Aiguille and Dôme du Goûter, and by the more difficult route from the Brenva glacier; the Col de la Tour Noire, a most laborious pass, near the Aiguille d'Argentière, and the Roththal Sattel, one yet more dangerous, under the Jungfrau; the highest peak of the Grandes Jorasses, the Dent d'Hérens, the Parrot-Spitze of Monte Rosa and its culminating peak by a new route up the Grenz glacier, but probably there were very few of the more noted peaks and passes of the Alps with which Melchior was not acquainted. Besides this, he was an expert wood-carver, and small statues of friends from his chisel have more than once been exhibited in England. Melchior deservedly won the affection of all who had travelled in his company. He was one of nature's gentlemen, and the late C. E. Mathews, whose companion he had been for thirty-four years, truly says in his "Annals of Mont Blanc" that he was "perhaps the greatest all-round guide whom the love of mountaineering has ever produced. . . . It is with a peculiar pleasure and pride that I record that I never heard him utter a word to which the gentlest woman could object, and that I have never found him unequal to any kind of emergency."

IN the *American Museum Journal* for October-November Mr. G. G. MacCurdy, under the title of "Palæolithic Art as Represented in the Collections of the American Museum of Natural History," describes a number of objects acquired in France in 1912 by Prof. H. F. Osborn and the author. Among the most interesting specimens are a series of the tallies, or *marques de chasses,* which have been interpreted as records of their "kills" by the Aurignacian hunters; a set of perforated teeth, and shells of the Middle Aurignacian period from the Abri Blanchard, Dordogne; a holed limestone fragment, of which the utility is uncertain, it may have been used as a weight; figures of a horse engraved on stone of the Upper Aurignacian period from Roches-de-Sergeac, Dordogne, and of a reindeer on bone from Limeuil.

THE custom of cross-cousin marriage in South India, recently discussed by Dr. W. H. R. Rivers, is further considered by Mr. F. J. Richards in the December issue of *Man.* He arrives at the conclusion that it is based on economic considerations, and, in particular, on the mode of transmission of family property. The Dravidian people follow the rule of matrilinear succession. They subsequently came under the influence of the intrusive Brahmanical culture, in which the rule of patrilinear succession is followed. The effect of this clash of rival cultures was the desire of the matrilinear community to secure the advantages of patrilinear transmission of the estate; that is to say, the natural desire of the father to provide for his offspring might be secured by insisting that a man should marry the daughter of his maternal uncle, of his paternal aunt, or of his sister. This arrangement would enable a matrilinear community to conform to the patrilinear system of inheritance without fear of dissipating the family property, which is dependent on inheritance on matrilinear lines. The present practice of cross-cousin marriage is thus a compromise between the Dravidian rule of succession through the mother and the Brahmanical rule of succession through the father.

NEARLY the whole of part 6 of the tenth volume of Records of the Indian Museum is devoted to an account of fresh-water and terrestrial oligochætous worms, mainly collected in northern India, with descriptions of a number of new species. The author, Dr. J. Stephenson, of the Lahore College, remarks that the most noteworthy item is the occurrence of *Microscolex phosphoreus* (a widely spread species, the original home of which was probably in temperate South America), near Peshawar, at a distance of 700 miles from the sea. Although the dispersal from its original home across the Atlantic and Indian Oceans was doubtless due to the prevalent westerly winds, transport by human agency seems the only explanation of its isolated occurrence in the heart of northern India.

THE *Aarsberetning* of the Bergen Museum for 1913 and the first half of 1914 records steady progress in all departments during the period under review, a satisfactory incident being the bequest of 7000 kr. for general purposes Numerous additions to the exhibited series of mammals and birds were made, but, judging from some of the figures in the text, there appears room for much improvement in the method of taxidermy. Ocean-surveying and the work of biological stations were carried on with great energy, reports from no fewer than forty-three stations being quoted. The contour of the channels of many of the Norwegian fjords is illustrated by a transverse section of the Sognefjord, in which the sudden descent of the sides and the great depth of the middle are well shown.

DR. W. SØRENSEN has published in French an important paper (*Kgl. Danske Videnskab. Selskabs Forhandlinger,* 1914, No. 3), on the anatomy of the Solifugida, that remarkable order of Arachnida which has attracted many zoologists to its study and which formed the subject of a lengthy memoir by the late H. M. Bernard (Trans. Linn. Soc. Zool., 2 ser., vol. vi.). The author criticises Bernard's work with some severity, pointing out that the latter's belief in the poisonous nature of the Solifugida is unsupported by facts, and that the structures designated by him as "coxal glands" have no openings on the haunches of the foremost legs, but terminate on short processes situated on the dorsal aspect of the appendages of the second pair. These appendages are termed "mandibules" by Sørensen. Considering the anterior position of the excretory organs under discussion, Sørensen's comparison of them with the Malpighian tubes of insects, which are outgrowths of the hind-gut, must remain open to question.

IN a recent issue of the Bulletin of the Imperial Botanic Garden of Petrograd (vol. xiii., No. 4), G. A. Nadson describes a number of interesting sulphur bacteria from brackish water in the Gulf of Finland. Two of the forms described are peculiar from the fact that the cells contain in addition to stored sulphur a substance which readily decomposes into oxalic acid; these bacteria live in badly aerated mud, and by increasing the oxygen supply the oxalite-like substance was found to increase, and the accumulation of sulphur to diminish, and *vice versa.* A remarkable new genus of sulphur bacteria, called Thiosphærella, was discovered, which contained in its cells large quantities of a starch-like substance; the other forms described are new species of the genera Achromatium and Thiophysa.

IN a paper which appeared in the *Annals of Botany* (vol. xxviii., No. cxii.) and of which we have received a reprint, Mr. S. R. Price describes some results obtained in the study of plant cells by the method of dark-ground illumination, a method hitherto but little used in botanical work. The method often reveals new structural features and is useful in establishing the presence of particles which are difficult to see or which are unresolved in direct illumination, but is very restricted in application on account of the difficulty of selecting suitable material for examination. Some of the author's observations indicate possible lines of work rather than completed results. For instance, it is generally recognised that protoplasm is a colloidal complex, apparently existing both in the hydrosol and hydrogel state, the two states being spontaneously reversible; the process of germination of fungus spores, followed by the dark-ground method, showed the gradual conversion of the gel contents of the spore into a hydrosol on absorption of water, and later a formation of a gel might occur again. The nucleus and chloroplasts are probably specialised parts of the plasma with a hydrogel structure, but only in favourable cases could the nucleus be studied. Particles and vesicular bodies (which the author terms "sap particles") were usually found in the cell-sap and showed a continuous Brownian movement; they usually increased in number with decreasing vitality of the cell.

The problem of the dolomitisation of limestone has received an interesting contribution from Prof. R. C. Wallace, of the University of Manitoba (*Compte-rendu* of the twelfth International Geological Congress, 1914, p. 875). He regards the concentration of magnesium ions in the solution from which dolomite is precipitated as in many cases the determining factor. This concentration at moderate depths of sea-water may determine whether calcite or dolomite is stable; at a certain concentration of magnesium, calcite goes into solution and dolomite is deposited. In a solution in which calcite is stable, magnesium carbonate may be unstable, and may go into solution until the magnesium ions are sufficiently abundant to produce a precipitation of dolomite. In the case, again, of underground water bringing magnesium into a limestone, a solution may abruptly arise in which calcite is unstable and becomes replaced by dolomite. It will be seen that this view differs from the older one of the mere substitution of magnesium for part of the calcium present in a mass of calcium carbonate.

We have received from Prof. Eredia a pamphlet entitled "The Organisation of the Service of Weather Predictions in Italy," reprinted from the *Rivista Meteorico-Agraria* (vol. xxxv., 50 pp.). An experimental system of weather telegrams was instituted in the Papal States from July to December, 1855, and the observations were forwarded to Padre Secchi for examination. His report of the experiment was favourable, but practically the commencement of the service dates from April, 1866, when observations were telegraphed to the central office at Florence. After the removal of the latter to Rome the service was frequently improved, under the direction of Prof. Tacchini, and the daily weather report has latterly again been considerably enlarged. The present director is Prof. L. Palazzo, whose name is well known to many of our readers by the interest he takes in geophysics generally. Prof. Eredia also gives a brief sketch of the origin of the weather service in Europe. With reference to this country he remarks that in 1860 the Astronomer Royal informed M. Le Verrier (Paris) of the proposed establishment of a service on our coasts, and requested an exchange of bulletins. This is strictly true, but it might be explained that the communication was in reply to an inquiry by M. Le Verrier, which would naturally have been referred to Admiral FitzRoy before being dealt with. The latter issued daily weather reports to newspapers from September 3, 1860, and storm warnings from February 5, 1861. It may be worth while to direct attention to two apparent slips in the last paragraph but one on p. 7 of Prof. Eredia's laborious and useful compilation (with reference to a storm on December 1–2, 1863): Islanda should read Irlanda, and M. Davy is quoted as director of the English service.

In a review of Dr. Hobson's "Squaring the Circle" in the Bulletin of the American Mathematical Society for November, Prof. R. C. Archibald directs attention to the early use of the symbol π by William Oughtred (1574–1660) in his "Clavis Mathematica" of 1631 and in his "Theorematum in Libris Archimedes de Spheara et Cylindro Declaratio" (Oxford, 1652). Oughtred employs the symbols $\delta : \pi$ to represent the ratio of the semidiameter to the semiperiphery of the circle, although he does not use the symbol π separately. He states specifically that $\pi R/\delta$ is the semiperiphery of a circle of radius R. Prof. Archibald further directs attention to references to squaring the circle in the Birds of Aristophanes (produced 414 B.C.), lines 1004–5, and in the last canto of Dante's "Paradiso" (canto 33, lines 133–5, in Cary's translation), and he points out that Longfellow, in his translation, gives "to square the circle" as the equivalent of the Italian "Misurar lo cerchio."

In an article on "The Conic as a Space Element," in the Transactions of the American Mathematical Society, xv., 4, Mr. Roger A. Johnson develops a system of co-ordinates for the conic in three dimension space analogues to the line co-ordinates of Plücker, by treating the conic as a degenerate envelope. It is interesting to note that the problem of the conic in space has been studied for the last sixty years, and that in 1908 the Belgian Royal Academy announced the offer of a prize for a discussion of the subject. It may, however, be pointed out that the problem of the aeroplane in space is at the present time of a far more urgent character, and that the most pressing need is for pure mathematicians who find no difficulty in dealing with cumbersome formulæ as abstract as those which occur in connection with these harmless but unprofitable conics. Still, it is interesting to learn that the totality of conics of a T_4 that touch two fixed planes, the intersection of which does not meet the axis of the T_4, constitute a T_2 of the most general type.

OUR ASTRONOMICAL COLUMN.

The Approaching Maximum of o Ceti.—According to prediction, o Ceti or Mira will be at its maximum brightness on February 11 next, but it should be noted that both the star's period and brightness are not always the same at each return to its full brilliancy. As the star remains at its maximum brightness (2·0 mag.) for about fourteen days, it will be at a maximum on February 4 (approx.). At the present time it is a conspicuous ruddy object in a 4-in. telescope (mag. about 6·0), and its spectrum discloses the strikingly brilliant flutings and the bright hydrogen